Distributed Energy Resources: Air Permitting and Regulatory Factors

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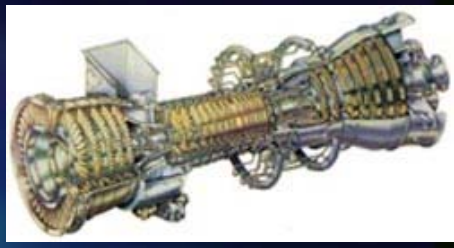
Background

- Distributed energy resources (DER) and combined heat and power (CHP) have the *potential* to reduce emissions through improved energy efficiency and use of cleaner technologies.
- As with other combustion processes, combustion-based DER/CHP projects may require air permits.
- It remains difficult to "credit" CHP/DER, renewable energy, and energy efficiency for avoided or displaced emissions under current regulatory approaches.

Types of Air Permits

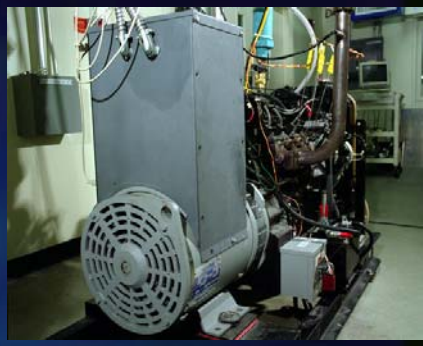
- Minor New, Modified and Certain Major Source Construction Permits ("Minor" NSR)
- Major New, Modified and Certain Major Source Construction Permits in Nonattainment (NA) Areas
- Prevention of Significant Deterioration (PSD)
- Operating Permits
  - State, acid rain, Title V Fed Op Permit

"Minor" NSR Permitting



- Construction of a new air pollution source
- Modification, relocation, or reactivation of an existing source
- Exemptions for small sources (9 VAC 5-80-1320)
- Typically require "best available control technology" (BACT) for criteria pollutants
- "Maximum achievable control technology" (MACT) may be needed for hazardous air pollutants (HAPs)
- May include limitations on throughputs, rates, materials, fuels, etc.
- Measurement, record keeping, etc. requirements

"Minor" NSR Permitting



- Modification (9 VAC 5-80-1110) defined as physical or operational change that would result in net emissions increase in regulated pollutants
- Unless limited by previous permit conditions:
  - **Alternative fuel or raw material may not necessarily be a *modification* if emissions would decrease**
  - **Adding a system or device whose primary function is to reduce air pollution is not necessarily a *modification***

"Minor" NSR Permitting

- Exemptions (9 VAC 5-80-1320) include, among others--
  - External combustion units with heat input:
    solid fuel < 1 MMBtu/hr heat input
    liquid or liquid/gas < 10 MMBtu/hr heat input
    gas < 50 MMBtu/hr heat input
  - Emergency engines and turbines operating 500 hr or less per yr below certain size
  - Exhaust flares at natural gas and coalbed methane extraction wells

Minor NSR Permitting

- Exemptions (continued)
  - New source with potential to emit less than

CO	100 t/yr	NO_x	40 t/yr	
SO_2	40	PM	25	
PM_{10}	15	VOC	25	and others*

  - Modification or reconstruction with net emissions increase less than

CO	100 t/yr	NO_x	10 t/yr	
SO_2	10	PM	15	
PM_{10}	10	VOC	10	and others*

*Municipal waste combustion gases are among these

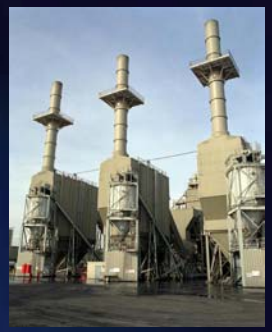
"Minor" NSR Permitting

- Procedure
  - Contact DEQ regional office
  - Complete Form 7 application
  - Demonstrate incorporation of BACT
  - Show that local zoning requirements satisfied
  - DEQ review--normally up to 90 days; 120 days if public participation required
  - Air Board may require public hearing and public comment period if controversial, requested by locality, or if emissions of any one pollutant increase by 100 or more t/yr

Nonattainment Area Major NSR Permitting

- New, modified, relocated, or reactivated major source of criteria pollutant in nonattainment (NA) area
- >50 t/yr VOC or NO_x: major in N.VA--*serious* NA
- N. VA to become *severe* NA; >25 t/yr is major
- Hampton Roads, Richmond, Roanoke, Fredericksburg, Frederick Co., Shenandoah NP are proposed NA areas under new O_3 standard

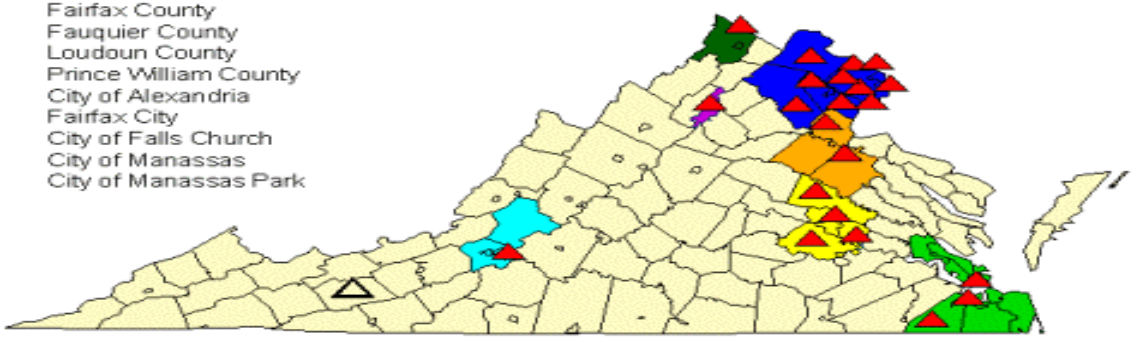
Nonattainment Area Major NSR Permitting



Frederick County Nonattainment Area
Frederick County
City of Winchester

Fredericksburg Nonattainment Area
Caroline County
Spotsylvania County
Stafford County
City of Fredericksburg

Northern VA/MD Nonattainment Area
Arlington County
Fairfax County
Fauquier County
Loudoun County
Prince William County
City of Alexandria
Fairfax City
City of Falls Church
City of Manassas
City of Manassas Park



Shenandoah National Park Nonattainment Area
Shenandoah National Park
(the portions in Page and Madison Counties)

Roanoke Nonattainment Area
Botetourt County
Roanoke County
City of Roanoke
City of Salem
Town of Vinton

Hampton Roads Nonattainment Area
James City County
York County
City of Chesapeake
City of Hampton
City of Newport News
City of Norfolk
City of Poquoson
City of Portsmounth
City of Suffolk
City of Virginia Beach
City of Williamsburg

Richmond Nonattainment Area
Charles City County (partial)
Chesterfield County
Hanover County
Henrico County
City of Colonial Heights
City of Hopewell
City of Richmond

Monitor Location

Nonattainment Area Major NSR Permitting

- VOC, NO_x controls must meet "least achievable emission rate" (LAER); also CO in two localities
- VOC and NO_x offsets required at greater than 1.2:1 depending on severity of NA
- certain toxics/HAPs subject to specified limits
- Newspaper notice; public info meeting; public hearing required

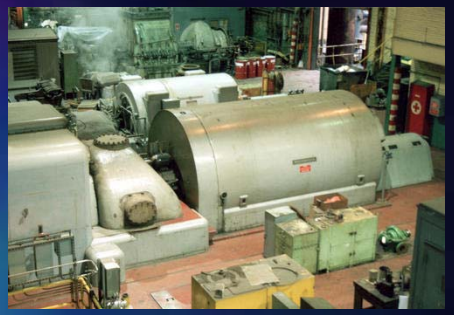
PSD Permitting

- New, modified, relocated, or reactivated major source in attainment areas
- Major means 250 or more t/yr of regulated pollutant
- For 28 specific industries, 100 or more t/yr, incl.
  - fossil fuel boilers & electric plants >250 MMBtu/hr input
  - municipal incinerators, capacity >250 t/day refuse
  - chemical, Kraft pulp, many 1^0&2^0 metals, acids, …
- BACT; not exceed PSD "increment" for area
- 1 yr meteorological/air qual. data to analyze impacts
- Newspaper notice; public info meeting; public hearing required

Operating Permits

- State Operating Permits
  - can be used to establish limits on potential to emit so source is below "major source" threshold and avoids stricter federal operating permit requirements.
- Acid Rain Operating Permits
- Title V Federal Operating Permit
  - emit or potential to emit 100+ t/yr any criteria pollutant
  - (50+ t/y NO_x or VOC in N. VA)
  - or 10 t/y or more of any HAP
  - or 25 t/y or more of any combination of HAPs

CHP/DER Issues



- CHP proponents advocate output-based emissions standards
  - would recognize and reward improved efficiency
  - VA standards are still heat value input-based
  - however, NSR permit exemptions are based on threshold emissions levels irrespective of efficiency

    (i.e., pollution greater than threshold requires permit)
  - also distinction between major and minor sources based on threshold emissions levels
  - useful heat output may be difficult to assess

    (just because system may recover heat doesn't mean that it is all usefully employed)

CHP/DER Issues

- No "credit" for avoided or displaced utility emissions
  - CHP/DER proponents want recognition and credit for utility emissions avoided or displaced by DER
  - Regulators ask "how do you know that the utility won't generate the same amount and sell the power elsewhere?"
  - What blend of power is displaced--coal, oil, gas, nuclear--determines what emissions are displaced.
  - Regulators are cautious:
    - permit conditions must be "practically enforceable"
    - emissions and their reduction must be quantifiable and verifiable

CHP/DER Issues

- NO_x emission trading
  - trading program geared toward major NO_x sources
  - small sources can "opt-in" but unclear what incentives are to do so
  - since allowances are allocated to major sources and "opt-ins" (if any), no clear mechanism for crediting reductions by other sources

    (e.g., utility can't get NO_x credit by buying clean busses for localities or subsidizing low-NO_x residential furnaces)
  - EPA allows states to "set aside" credits for renewable energy--VA is not doing this

CHP/DER Issues

- State Implementation Plans (SIPs)
  - NO_x SIP Call led to VA NO_x trading program
  - reductions have to be quantifiable and enforceable
  - EPA draft policy would allow small % of SIP emissions reduction credit to be from "innovative measures"
  - regional plans focus on regional attainment of ambient air quality standards

    (i.e., displacing distant generation may be lower priority than reducing nearby and upwind emissions)

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Images courtesy: DOE, National Renewable Energy Lab, and California Energy Commission web sites